

Abstract

This thesis presents the use of laser as a carrier in free space to connect and transfer data between two computers for a long distance high speed Local Area Network technologies.

One of the computers is configured as a client computer, while the other is configured as a server computer. Each one contains LAN card and runs the Windows 98 operating system. The first LAN card in the client computer is a network interface card used 10Base-T unshielded twisted pair (UTP) cable to be coupled with free space optical converter card, which consists of a transmitter and receiver electronic circuits operating at 10Mbps speed.

On the other hand, the second LAN card in the server computer can also be coupled with another free space optical converter card by using 10Base-T UTP cable.

The use of a free space optical transmission link has extended the distance between the connected computers into local area network. The free space optical transmission link was implemented by building a 10Base-T (UTP)/Free space optical converter interface card and optics system which used a laser diode as an optical source and PIN photodiode as an optical detector.

Furthermore, a remote control application software has been written. This software enables the client computer to

monitor and control an industrial control system, which is connected to the server computer through ISA interface card.

The application software was written in Visual Basic 6.0 language and based on the TCP/IP windows socket (Winsock) network programming technique.